

REMARKS

Claims 1-11 are pending. By this Amendment, claim 1 has been amended, and claims 7-11 are newly added. No new matter has been introduced by this Amendment.

The Office Action rejected claims 1-6 under 35 U.S.C. 102(b) as being anticipated by Bonsel et al. (U.S. Patent No. 6,197,147). This rejection is respectfully traversed.

Bonsel et al. discloses a process for continuous production of membrane-electrode assemblies wherein to bond the components, the electron-conductive material or at least one flat face of the membrane or both components are continuously coated with a solvent or a polymer solution. However, in the Examples of Bonsel et al., it is only disclosed that a solution of sulfonated polymer identical to the membrane material is applied to both faces of the membrane (Example 3). It is not disclosed that a good solvent is applied to at least one of the facing surfaces of the opposed electrode substrate and the electrolyte membrane, in order to bond the membrane with the electrode substrates. Bonsel et al. suffers from the problem that by applying the sulfonated polymer solution to the surfaces of the membrane an interlayer is formed between the membrane and the electrode substrate, and the thickness of membrane-electrode assembly is increased.

The present claims require, *inter alia*, a "process of manufacturing membrane-electrode assemblies, said process comprising pressure bonding an electrolyte membrane with electrode substrates to form a membrane-electrode assembly, wherein a good solvent for the electrolyte membrane is applied to at least one of facing surfaces of the opposed electrode substrate and the electrolyte membrane prior to the pressure

bonding, wherein the good solvent is applied in an amount of from 0.001 mg/cm² to 10 mg/cm²" (amended claim 1).

The presently claimed invention directly bonds the membrane with the electrode substrates by using the good solvent, and does not provide an interlayer between the membrane and the electrode substrates. Therefore, the presently-claimed invention does not cause the problem whereby the thickness of membrane-electrode assembly is increased.

Applicants note that the present specification states that the "good solvent will usually be applied in an amount of 0.001 to 10 mg/cm², and preferably 0.01 to 1 mg/cm²... [Too] high an amount leads to swelling and dissolution of the electrolyte membrane, resulting in deformation" (see the last paragraph [lines 18-24] of page 36 of the present specification). Thus, by keeping the amount of good solvent applied to 10 mg/cm² or less and preferably 1 mg/cm² or less, swelling is avoided.

In contrast, the object of Bonsel et al. is apparently to cause swelling. In particular, Bonsel et al. states that the adhesion is improved "by swelling in mixtures of a solvent" (see Bonsel et al. column 6, line 28). Thus, Bonsel et al. would not be expected to, and actually clearly teaches against, limiting the amount of solvent utilized to avoid swelling.

In order to expedite prosecution of this application, Applicants have amended the claims to define that good solvent is applied in an amount of 0.001 to 10 mg/cm². Applicants have also added dependent claim 11 limiting the amount to 0.01 and 1 mg/cm².

Thus, it is respectfully submitted that Bonsel et al. is missing claimed elements of the present claims (and teaches against such claimed elements), including the claimed element that good solvent is applied in an amount of 0.001 to 10 mg/cm². For at least these reasons, claims 1-11, each of which requires the presence of such an amount of good solvent, cannot be anticipated by (and would not have been obvious over) and are thus patentable over Bonsel et al. Reconsideration and withdrawal of the rejection of claims 1-11 under 35 U.S.C. 102(b) are respectfully requested.

Further, Applicants submit the following additional reasons for patentability with respect to new claims 7-10.

Support for new claims 7 and 8 may be found at least at page 32, lines 6-9, of the present specification. With respect to the presently claimed invention, by using an electrolyte membrane having a reduced amount of residual solvent, it is possible to prevent problems that may be caused by an electrolyte membrane that contains a large amount of residual solvent, as described in the present specification on page 34, lines 12 to 24. Bonsel et al. does not disclose or suggest this claim element. Accordingly, new claims 7 and 8 are also patentable over Bonsel et al. for this additional reason.

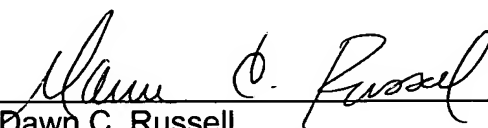
Support for new claim 9 may be found at least at page 36, lines 9-12, of the present specification. With respect to the presently claimed invention, by ensuring that the good solvent is applied to at least the facing surface of the electrode substrate, the adhesion between the electrolyte membrane and the electrode substrate can be improved. Bonsel et al. does not disclose or suggest this claim element. Accordingly, new claim 9 is also patentable over Bonsel et al. for this additional reason.

Support for new claim 10 may be found at least at page 37, lines 9-11, of the present specification. With respect to the presently claimed invention, by ensuring that the good bonding property of the electrolyte membrane and the electrode substrates can be easily achieved at a low pressure, in the range from 0.5 to 20 MPa (*i.e.*, 5×10^5 to 2×10^7 Pa), good durability is achieved. Bonsel et al. does not disclose or suggest this claim element. Accordingly, new claim 10 is also patentable over Bonsel et al. for this additional reason.

In view of the above remarks and amendments, Applicants respectfully submit that all of claims 1-11 are in condition for allowance. Favorable consideration and prompt allowance of the claims and this application are earnestly solicited. Should the Examiner believe anything further is desirable in order to place this application in even better condition for allowance, the Examiner is invited to contact Applicants' representatives at the telephone number listed below.

In the event this paper is not considered to be timely filed, Applicants respectfully petition for an appropriate extension of time. The Commissioner is authorized to charge payment for any additional fees that may be required with respect to this paper or credit any overpayment to Counsel's Deposit Account 01-2300, making reference to Attorney Docket No. 026035-00010.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Dawn C. Russell", is written over a horizontal line.

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